



# UNITED STATES PATENT AND TRADEMARK OFFICE

11A  
UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,031	03/22/2004	Koji Higuchi	9319A-000736	9984

27572 7590 04/05/2007  
HARNES, DICKEY & PIERCE, P.L.C.  
P.O. BOX 828  
BLOOMFIELD HILLS, MI 48303

EXAMINER
----------

UHLENHAK, JASON S

ART UNIT	PAPER NUMBER
----------	--------------

2853

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/05/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/806,031

Applicant(s)

HIGUCHI ET AL.

Examiner

Jason Uhlenhake

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4-11 and 16-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,2,4-11 and 16-27 is/are allowed.
- 6) ☒ Claim(s) 28 and 29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 28, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirano (U.S. Pat. 5,731,826) in view of Fukano (JP 63-141750)

#### ***Hirano discloses:***

- ***regarding claims 28, 29***, droplet ejection apparatus having a driving circuit (54) (Column 19, Lines 3 – 7; 21 – 30) and a plurality of droplet ejection heads (Column 5, Lines 33 – 37)
- droplet ejection heads include a cavity (323d) filled with a liquid, a nozzle (323c) communicated with the cavity (Figures 6, 16A, 16B)
- ejection failure detecting and recovery processing determining means which detects a residual vibration of the diaphragm at least when the apparatus is powered on (Column 3, Lines 20 – 30; Column 7, Lines 32 – 40)
- recovery means for carrying out the recovery processing determined by the ejection failure detecting and recovery processing determining means (Column 10, Lines 60 – 67; Column 24, Lines 1 – 7)

#### ***Hirano does not disclose expressly the following:***

- **regarding claim 28**, the ejection failure detecting and recovery processing determining means includes an oscillation circuit and the oscillation circuit oscillates in response to an electric capacitance component that varies with the residual vibration of the diaphragm

- **regarding claim 29**, the ejection failure detecting and recovery processing determining means includes an oscillation circuit and the oscillation circuit oscillates in response to an electric capacitance component of the actuator that varies with the residual vibration of the diaphragm

***Fukano discloses:***

- **regarding claim 28**, the ejection failure detecting and recovery processing determining means (buffer, 3; transistors, 7&8; diode, 11; capacitor, 10; resistance 16-21; Figure 1; page 5, lines 14-16) includes an oscillation circuit (piezoelectric element, 9; resistance, 13&14; Figure 1; page 5, Lines 17-20) and the oscillation circuit oscillates in response to an electric capacitance component that varies with the residual vibration of the diaphragm (oscillating plate, 26) (page 5 line 21 – page 6, line 16), for the purpose of detecting air bubbles in an ink chamber

- **regarding claim 29**, the ejection failure detecting and recovery processing determining means (buffer, 3; transistors, 7&8; diode, 11; capacitor, 10; resistance 16-21; Figure 1; page 5, lines 14-16) includes an oscillation circuit and the oscillation circuit (piezoelectric element, 9; resistance, 13&14; Figure 1; page 5, Lines 17-20) oscillates in response to an electric capacitance component of the actuator (9)

Art Unit: 2853

that varies with the residual vibration of the diaphragm (oscillating plate, 26) (page 5 line 21 – page 6, line 16), for the purpose of detecting air bubbles in an ink chamber

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Fukano into the device of Hirano, for the purpose of detecting air bubbles in an ink chamber

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection.

### ***Allowable Subject Matter***

Claims 1-2, 4-11, and 16-27 are allowed.

The primary reason for the allowance of claims 1-2, 4-11, and 16-27 is the inclusion of the limitation of a droplet ejection apparatus including judging means judges that paper dust is adhering in the vicinity of the outlet of the nozzle in the case where the cycle of the residual vibration of the diaphragm is longer than the predetermined range of cycle and shorter than the predetermined threshold. It is this limitation found in each of the claims, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

Art Unit: 2853

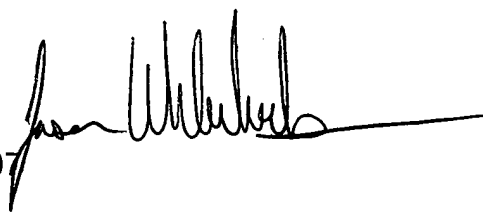
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Uhlenhake whose telephone number is (571) 272-5916. The examiner can normally be reached on Monday - Friday 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JSU  
March 31, 2007



**STEPHEN MEIER**  
**SUPERVISORY PATENT EXAMINER**